



*Virginia Information Technologies Agency*



# Wireless Call Processing Train The Trainer

**Tim Addington, ENP**  
**Bernard Brown, ENP**  
ISP Regional Coordinators

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Webinar  
May 12, 2015



# Integrated Services Program (ISP)

- Established in 2006
- Consolidation of
  - Public Safety Communications (PSC)
  - Virginia Geographic Information Network (VGIN)
- The ISP is VITA's consolidated, centralized program for delivery of services to local government public safety and geospatial programs.



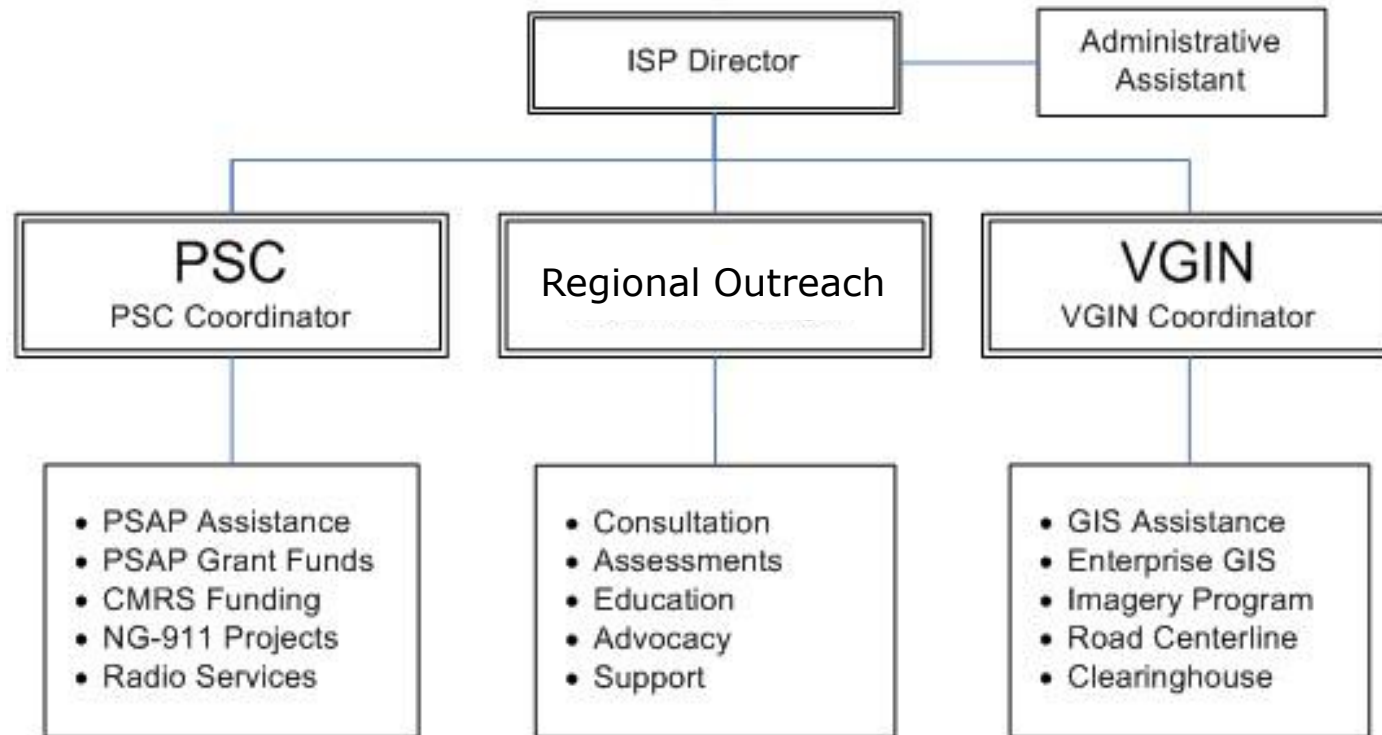


## ISP Goals

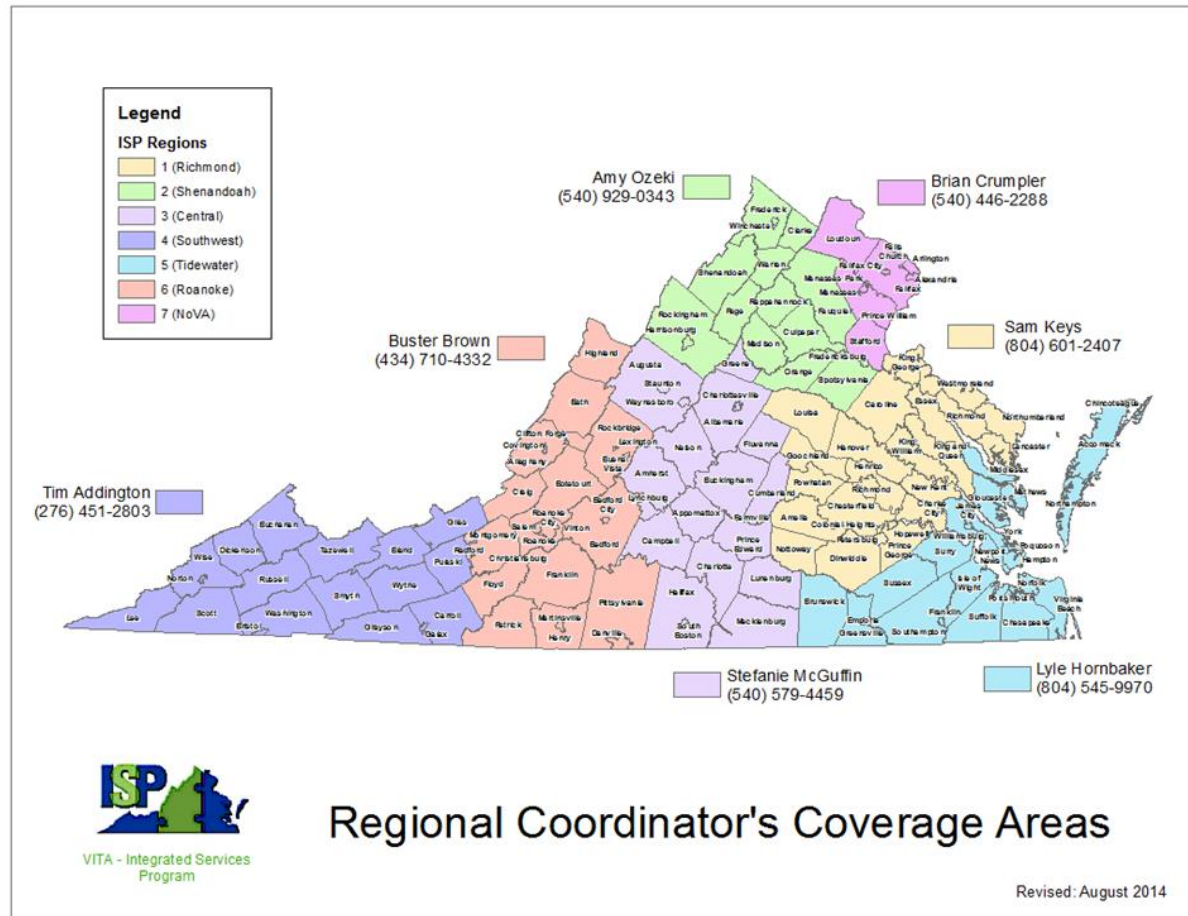
- Committed to helping our constituents achieve their business-oriented goals
- An effective collaborative approach that leverages the Commonwealth's economies of scale potentials that provides more cost effective solutions to state agencies and local governments
- A governance model that is coordinated among all interested stakeholders including the Boards and professional associations



# ISP Organization



# Regional Coordinators





## Webinar Instructors

- Tim Addington, ENP
  - Region IV Regional Coordinator
  - Former director of Scott County 9-1-1
- Bernard Brown, ENP
  - Region VI Regional Coordinator
  - Former director of City of Danville





## Logistics & Ground Rules

- Restrooms
- Emergency Exits
- Cell Phones (if allowed) to be on vibrate
- Continuing Education Credit
  - DCJS
  - OEMS
  - Others
- Name Tents
- Questions (are they allowed during or after)



# Introductions

- Name and agency
- Years experience
- Any specific wireless E-911 and call processing issues you want to address during training session?





## Students Experiences

- Basic Call Processing (wireline or wireless)
- Wireline Call Processing
- Wireless Call Processing
- VOIP Call Processing
- Text-to-911
- Non-Service-Initiated



## Current Training

- DCJS Academies
- On The Job Training
- Individual PSAP Training
- Vendor Training
- VITA-ISP



## Webinar Today

- There are various levels of training throughout the commonwealth
- Your agency's individual training program may surpass what we will be going over today
- This is not to replace DCJS training but is a tool to augment your training program



## New Hire VS Refresher

- Train ASAP
  - Don't wait until academy
- Refresher Training Annually
- As Specific Needs Arise
  - Errors in processing calls
  - New Call Handling Equipment
  - Upgrades to equipment which affect process



## Setting The Stage

- Wireless 9-1-1 in the News
- Videos
  - Denise Amber Lee Abduction
    - <http://www.deniseamberlee.org/news-and-media/video.html>
  - Georgia Tragedy
    - <http://youtu.be/06FOGQslMyc>



# Wireless E-911 Overview

- Review common terms
- Deployment Phases
- How wireless E-911 works
- Wireless technology solutions
- Classes of service
- Correct wireless call processing and understanding the ALI data
- Wireless issues to consider





## Wireless 9-1-1 Statistics

- Why is education so important?
  - 72% of all 911 calls made come from wireless devices
  - 40% of all U.S. households rely on wireless for their primary service and have dropped their landline phone service
  - Wireless devices are a way of life now:
    - Text messages
    - Smartphones
    - Still photos and videos
    - Ipads & laptops



# Key Terms

Virginia Information Technologies Agency



## Wireless 9-1-1 Call Processing Terms For The Telecommunicator

## Integrated Services Program Public Safety Communications



[www.vita.virginia.gov](http://www.vita.virginia.gov)



## Key Terms

- **Cell Sector** - One face of a cell antenna (typically 3-sided) that operates independently of the other sectors.
- **COS (Class of Service)** - A designation of the type of wireless location service. (MOBL, W911, WRLS, WPH1, WPH2)
- **COF (Confidence/Uncertainty Factor)** - Displays the estimated measurement area in meters based upon statistical calculations.
- **COP (Confidence Percentage)** - Displays the estimated percentage on how sure the Phase II location measurement is accurate.



## Key Terms

- **ESN (Emergency Service Number)** - An ESN is a three to five digit number representing a unique combination of emergency service agencies (Law Enforcement, Fire, and Emergency Medical Service) designated to serve a specific range of addresses within a particular geographical area, or Emergency Service Zone (ESZ).
- **pANI (Pseudo Automatic Number Identification)**  
A telephone number used to support routing of wireless 9-1-1 calls. It may identify a wireless cell, cell sector or PSAP to which the call should be routed. Also known as routing number.
- **GPS (Global Positioning System)** - A satellite based Location Determination Technology (LDT)



## Key Terms

- **Handoff** - The transfer of a wireless call in progress from one transmission site to another site without disconnection.
- **MPC – (Mobile Position Center)** - serves as the entity which retrieves, forwards, stores and controls position data within the location network.
- **MSC - (Mobile Switching Center)** - The wireless equivalent of a Central Office, which provides switching functions from wireless calls.
- **Rebid** - Query or request ALI information. Method used to retrieve Phase II call location information.



## Deployment Phases

- **Phase 0** is characterized by the wireless being delivered to the PSAP on a 10-digit telephone line. There is no location information or callback number. (legacy process and may never see)
- **Phase I** delivers the call to the PSAP based on the cell site and sector receiving the call and provides the address of the cell site and call back number for the caller.
- **Phase II** is delivered to the correct PSAP using the same method as Phase I, but the actual location of the caller is provided as a longitude and latitude. However, the longitude and latitude may deviate from the caller's actual location by a margin of error.



## Phase II Accuracy Requirements of the FCC

\*The accuracy differs between handset and network based solutions.

### Phase II - Accuracy



#### ◆ Handset Based Solution

- Global Positioning System (GPS) in handset
- Requires handset replacement
- 50 meters / 67% of the calls
- 150 meters / 95% of the calls

#### ◆ Network Based Solution

- Triangulating based on at least three cell sites
- Works with existing handsets
- 100 meters / 67% of the calls
- 300 meters / 95% of the calls



# Technologies

- There are two technologies utilized to determine the location of a caller
  - Handset Solution
  - Network Solution
  - The following are processes for determining location of the caller AFTER the call delivery has been made to the PSAP.

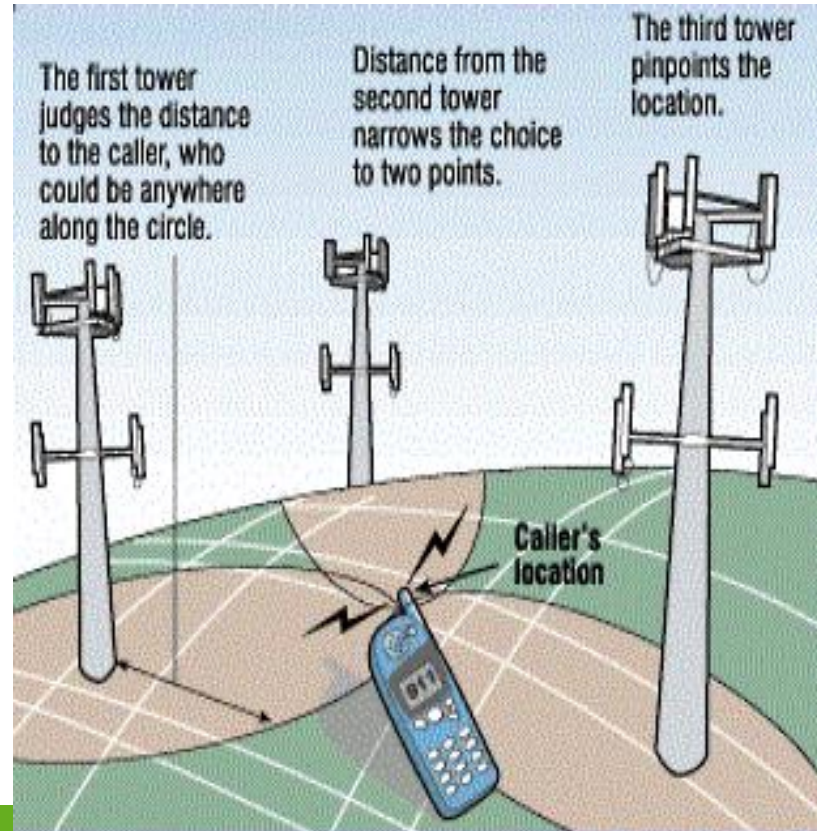


## Handset Solution

- Handset technology – FCC requires a GPS receiver in all new handsets by 2018. Currently 85% of devices have a GPS receiver chip. Older devices were not required to offer that type of technology.
- PROS –
  - Very accurate with a good satellite fix
  - Does not require access to multiple towers
- CONS
  - May require 15-20 seconds to calculate lat/long
  - Requires line of sight to satellites
  - Handsets require GPS chip that puts additional drain on battery
  - Older phones without GPS chips *cannot* provide location information
- Wireless Carriers using handset solution
  - Appalachian Wireless, Ntelos, Sprint, US Cellular, Verizon Wireless

## Network Solution

- Network technology is less accurate, but works with all existing handsets.





## Network Solution

- PROS
  - Can calculate lat/long very quickly
  - Does not require line of sight to satellites
  - Older phones can provide location information
  - Does not drain battery of cell phone
- CONS
  - Needs access to multiple towers to accurately calculate lat/long
  - Less accurate than GPS technology
- Wireless Carriers using network solution
  - AT&T and T-Mobile





## Facility Based VS Reseller

- Facility Based

- Appalachian Wireless
- Ntelos
- Sprint
- US Cellular
- Verizon Wireless
- AT&T
- T-Mobile

- Reseller

- Boost Mobile
- Cricket
- Tracfone
- StraightTalk
- Walmart Family Mobile
- Many more resellers

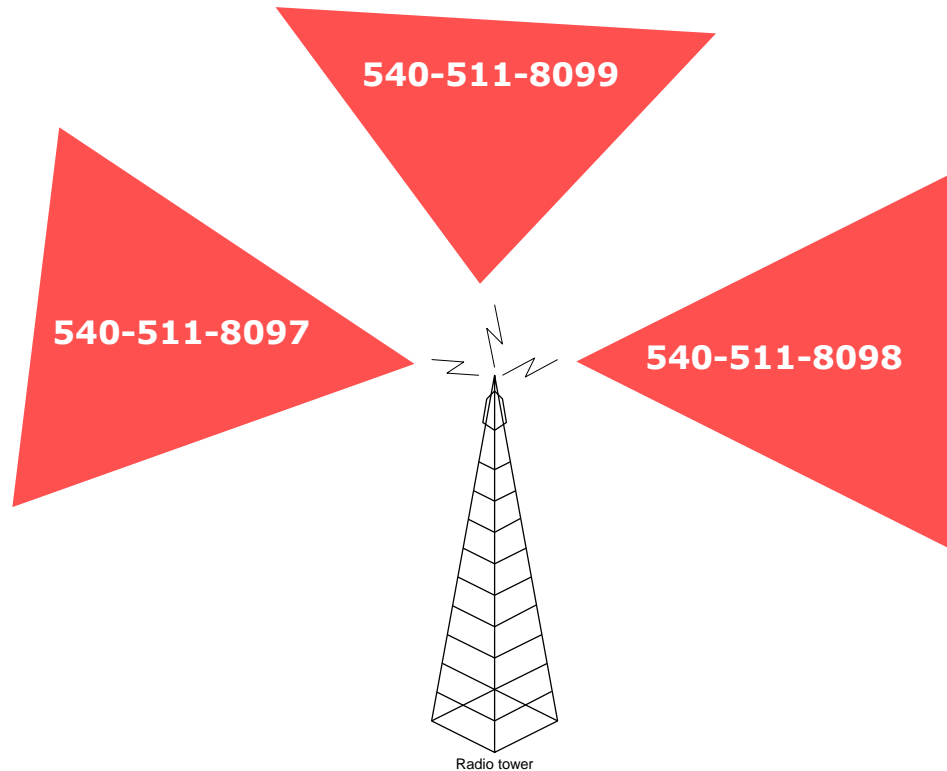




## How Wireless E9-1-1 Works

- Cellular Tower with three cell sectors. The number assigned to each sector is known as P-ANI. This number will appear on the ALI display. It is utilized for routing purposes and is not a valid callback number. Each sector can potentially be routed to different PSAPs.
- Often this number is referred in more technical terms as the ESRK (Emergency Services Routing Key) or ESRD (Emergency Services Routing Digits)

# Cell Tower with Sector pANI

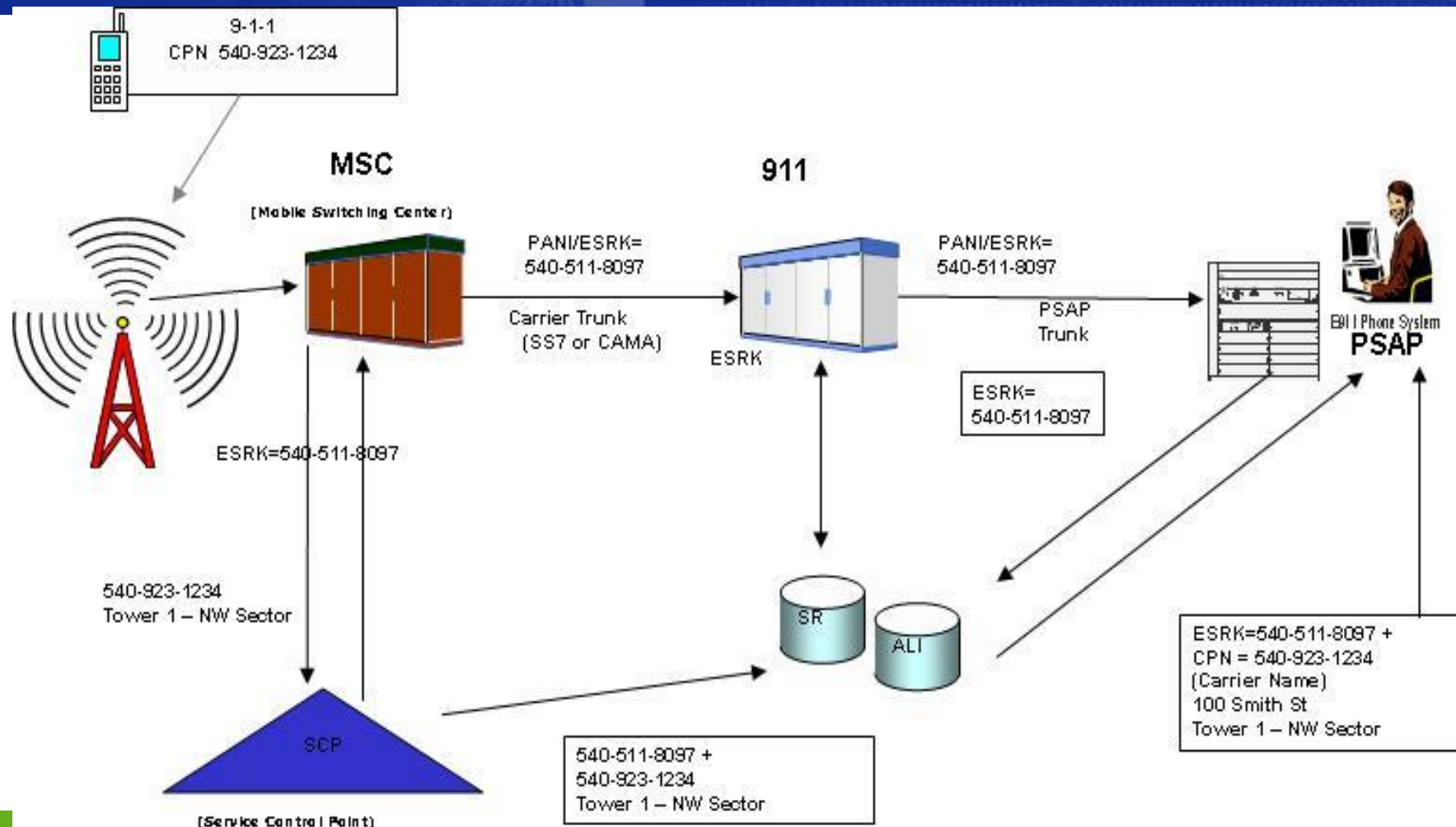




## Simulation of Cell Sectors

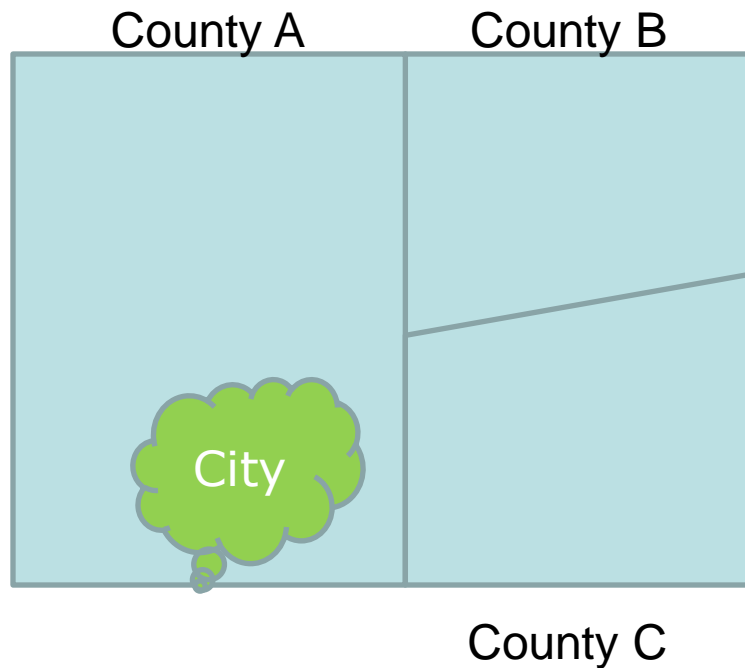
- Set up 3 chairs in a triangle
- Three individuals standing back to back in a triangle

# Wireless 9-1-1 Call Delivery



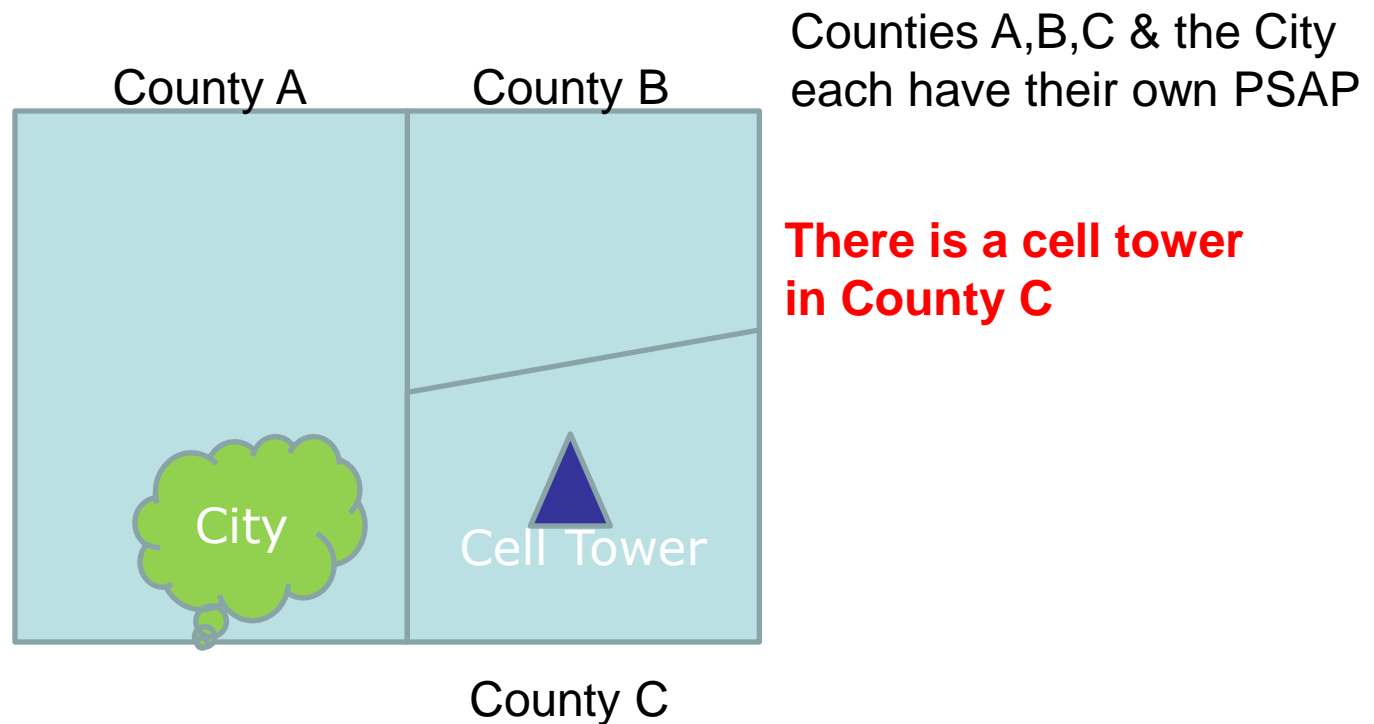


# Wireless E9-1-1 Call Routing

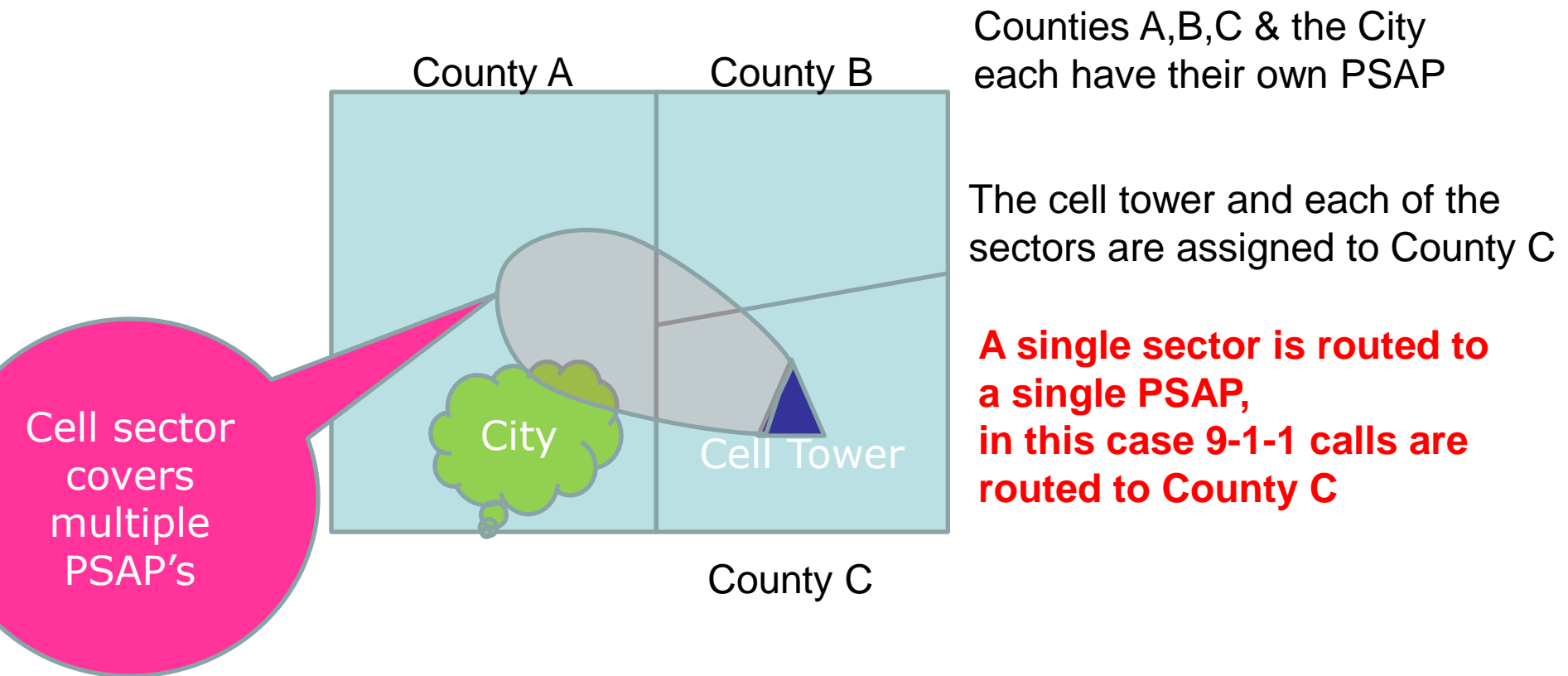


**Counties A,B,C & the City  
each have their own PSAP**

# Wireless E9-1-1 Call Routing

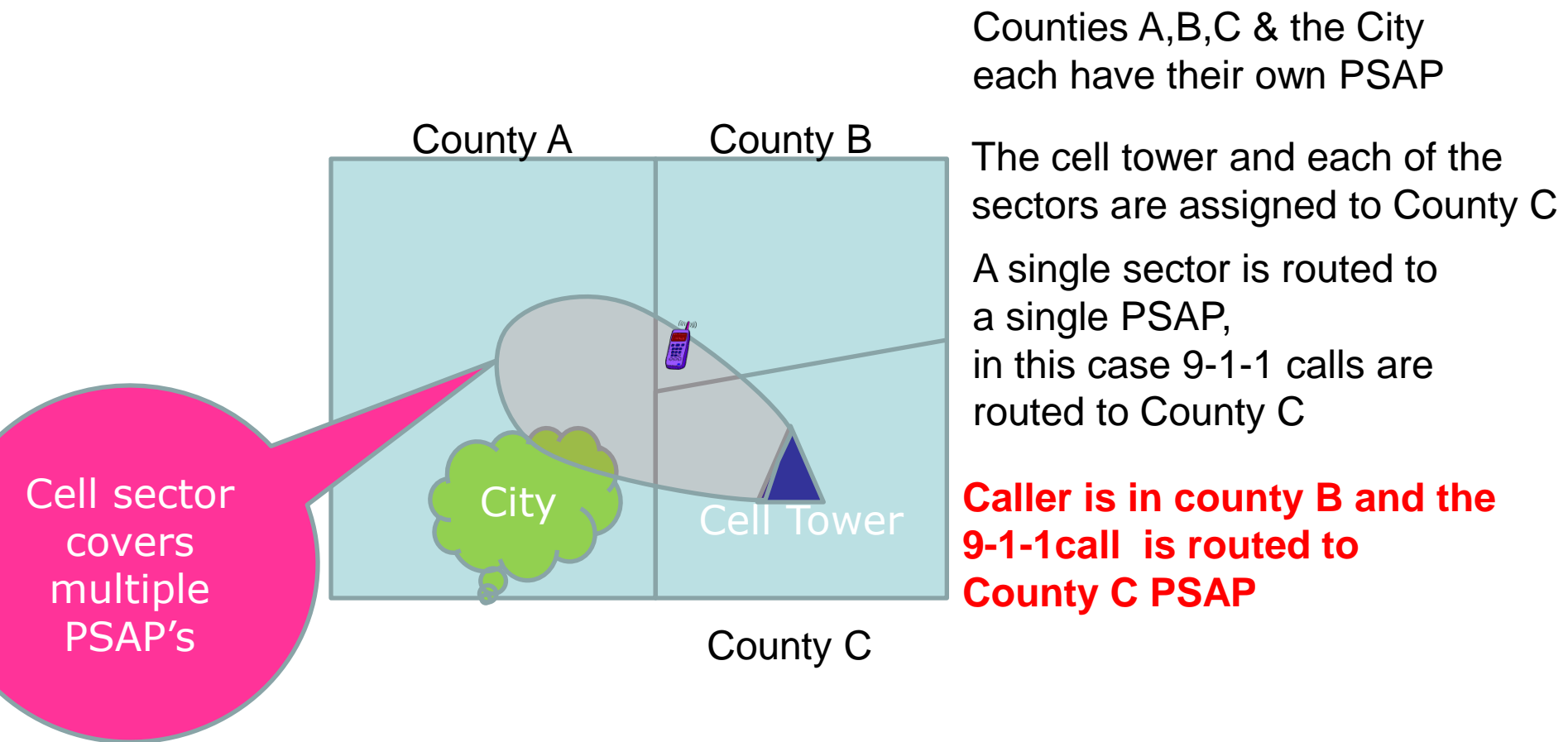


# Wireless E9-1-1 Call Routing

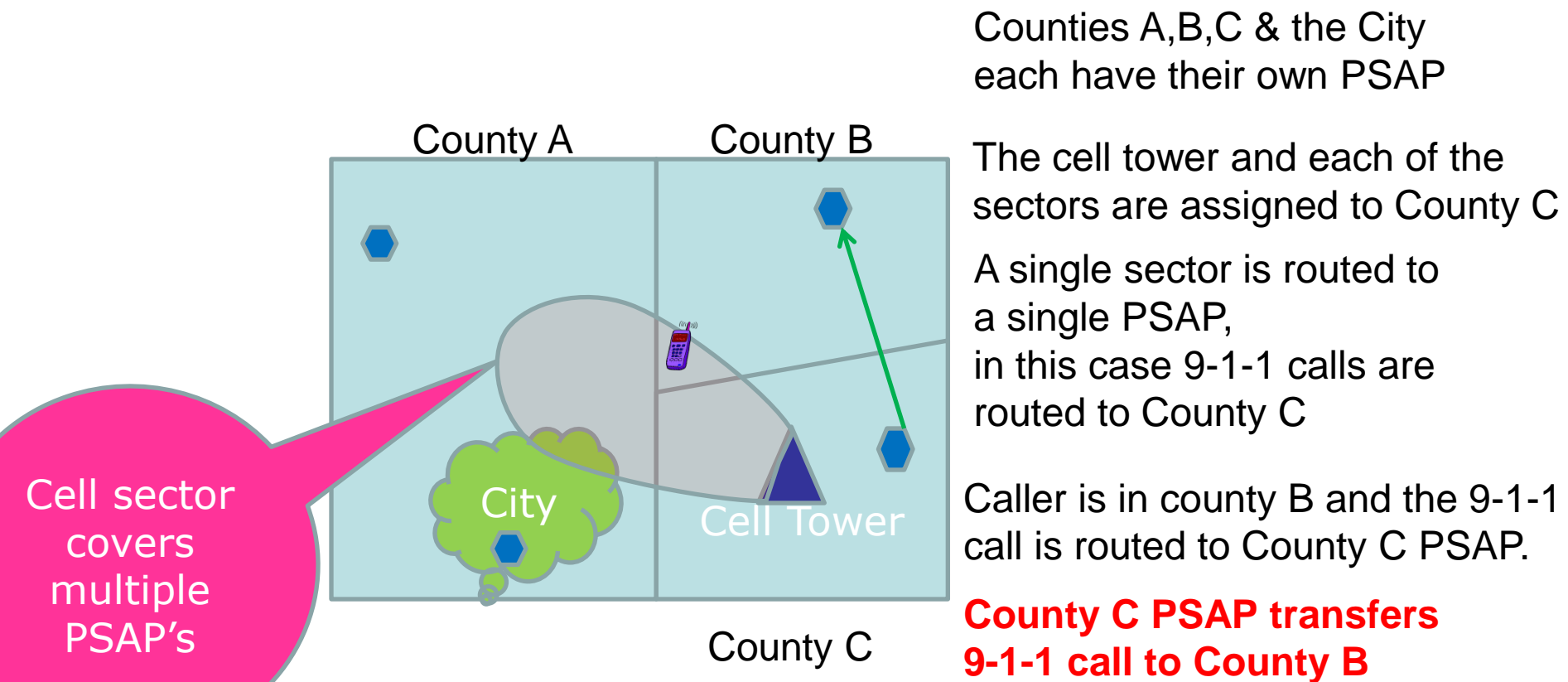




# Wireless E9-1-1 Call Routing



# Wireless E9-1-1 Call Routing





## Call Handling Equipment

- Currently there are 6 types in the Commonwealth
  - Airbus Communications DS (Cassidian)
  - Intrado
  - Motorola-Emergency CallWorks
  - TCS
  - TriTech (911Inc)
  - Zetron



## What My Screen Is Telling Me!

- Each has a different appearance, but the information and process to update the information is similar.
- Trainer should be aware of the types of systems that the students are utilizing.



# Sample ALI Screens

Callback Number ← 540-397-2710 07/13 16:54:42 1 6

Wireless Service Provider ← WIRELESS-NTELOS (XYP) WRLS → Class of Service

P-ANI ← (540) 511-7769 NW SECTOR SALEM

Lat/Long ← LAT:+037.294120 LON:-080.062050

Confidence Factor and Percentage ← COF: 2506 COP:95

Emergency Calls Waiting 0

Emergency Calls on Hold 0

Admin Calls Waiting 0

Request ALI Release Call Pick Up 9-1-1 Call Refuse Call Call History

CAUTION: WIRELESS CALL

220 E MAIN ST

SALEM VA

BANK CELL317 3

ELV: MTN:540-511-7769 CPF: ESN:00594

VERIFY PD

VERIFY FD

Case No.: N/A



Even though this call shows WPH2 for Phase II, notice the extremely high COF (meters).

```
540-588-9005 07/13 14:03:17 142
CAUTION: WIRELESS CALL
WIRELESS-VERIZON(XYP) WPH2
      220      EAST MAIN STREET

SALEM      VA
(540) 511-8611 NW SECTOR DOWNT
OWN SALEM      CELL220 3
LAT:+037.293187 LON:-080.054926
ELV:      COF: 10502      COP:95.
MTN:540-511-8611      CPF:
      ESN:00594
```

10,502 meters is approximately 6.5 miles



## Re-bid

### Re-bidding the ALI for a wireless caller may be helpful when –

- The call comes into the PSAP displaying “No ALI” or “No Record Found” .
- The call comes into the PSAP with Phase 1 information only. This includes callback number and tower location only.
- The caller is traveling and you need updated information about his/her location.
- If the COF is poor and you need to try to obtain a more accurate location. (Ex. The COF is 0 or very high)
- Re-bids only work while the call is still active.





## Re-bid

- **Different terminology -but concept is the same**
- Rebid - TriTech
- Rebid ALI - TCS
- RTX - Intrado
- Request ALI - AirBus DS (Sentinel)
- Repeat (Interact)
- Retry ALI – (Motorola-Emergency CallWorks
- Update-Airbus DS (Vesta 911)
- All are the same

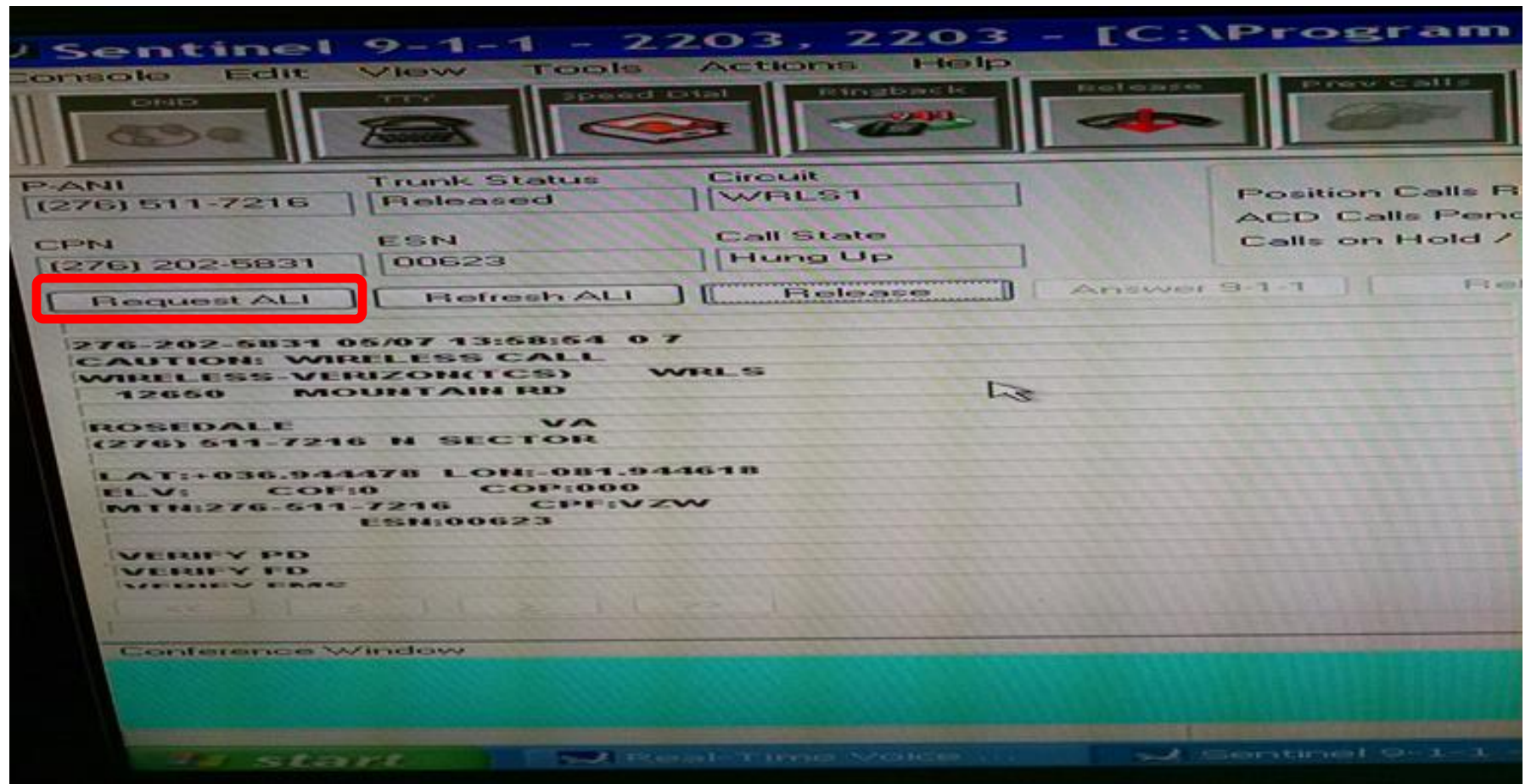


## **Rebid Reference Screen Shots**

- We have collected a series of screen shots in the next few slides.
- This is to reiterate the importance that a telecommunicator needs to be aware of how to rebid a call.



# Airbus DS Communications





# Airbus DS Communications

Cassidian Communications

Layout ▾ Console ▾ ? ▾

RINGDOWNS

FS201	FS 204
FD202	FS 203
AMR	SO AVATION
FON PD	COL PD
RED PD	RIA PD
LLU ER	OTO FIRE
UPRR YARD	KINDER MORGAN
VALLEY SO	DESERT SO
OASIS	AIR COM

INCOMING CALLS

In Calls

Call Control

Ready

Release

Mute All

Transfer

Priority PCA

Call Information Display

Call Info List 1 of 10

(951) 719-2100

(951) 719-2100 15:29 08/30  
42505 RIO NEDO

TEMECULA CA 101 BUSN  
PLANTCML

(951) 719-2100

LAW ENFORCEMENT PROVIDER

FIRE PROVIDER

EMS PROVIDER

LAT LON  
METERS PERCENT

Manual Request Update Clear Incorrect Location

Dial Status

Not Ready Idle

2284

TTY Master Volume

Dial Directory

Top Back

Search

FIRE DISPATCH FIRE DEPTS FIRE STATIONS COUNTY FIRE

HOSPITALS HELICOPTERS UTILITIES ROADS

CITY INFO FLOODS OTHER.... LAW DISPATCH

911 FLASH CELLULAR 911 TRANSFERS AMBULANCES

AMR RINGDOWN FIRE AGENCIES FIRE DISP CTRS

Dial Pad Contact Search Priority Abandon Flash

Vesta 911

Line S... 911 T... Admin... RINGD... Other...

4:23:14 PM





# Airbus DS Communications

Vesta 911

The screenshot displays the Airbus DS Communications interface, which is divided into several functional areas:

- Call Control:** Located at the top center, it includes a large red 'Ready' button with a white minus sign, a 'Release' button with a double arrow, a 'Mute All' button with a microphone icon, a 'Transfer' button with a call transfer icon, and a 'Priority PCA' button with a call and up arrow icon.
- Call Information Display:** Below the call control buttons, it shows a 'Call Info List' with '1 of 10' entries. The selected entry is for '(951) 719-2100'.
- Call Details:** The selected call entry shows the following information:
  - Phone Number: (951) 719-2100
  - Time: 15:29
  - Date: 08/30
  - Location: RIO NEDO
  - Address: TEHECULA, CA 101 BUSM
  - Address: PLANTCML
  - Phone Number: (951) 719-2100
  - Service Type: LAW ENFORCEMENT PROVIDER
  - Service Type: FIRE PROVIDER
  - Service Type: EMS PROVIDER
  - Location: LAT METERS
  - Location: LON PERCENT
- Call Control Buttons:** At the bottom of the call details section, there are four buttons: 'Manual Request', 'Update' (highlighted with a red box), 'Clear', and 'Incorrect Location'.
- Dial Directory:** On the right side, there is a 'Dial Directory' section with a search bar and several icons for different services: FIRE DISPATCH, HOSPITALS, CITY INFO, 911 FLASH, and AMR RINGDOWN.
- Left Sidebar:** On the left side, there is a vertical list of call types: FS 203, SO AVATION, COL PD, RIA PD, OTO FIRE, KINDER MORGAN, DESERT SO, and AIR COM.



# Intrado

The screenshot shows a software interface with a top toolbar containing icons for a person, a pencil, a hand, and several empty buttons. Below the toolbar, there are buttons for 'ALI', 'RTX' (highlighted with a red box), 'TTY', and 'Compose'. The main area displays call details for a call from 'CARPENTER CHRISTENE' at '276-926-6850'. The call is classified as 'RESD'. The address is '113, HAMPTON ST, CLINTWOOD, CLINTWOOD PD/DICK CTY S O VA'. The exact number is '276-926-6850' and the ESN is '253 - Clintwood'. The tell tale is 'CLINTWOOD PD/DICK CTY S O CLINTWOOD/MCCLURE FIRE CLINTWOOD/DICK CTY AMB'. The comments are 'COF: COP:'.

Tel. #	276	926-6850	Ext.		Class	RESD
Caller	CARPENTER CHRISTENE				Main #	276-926-6850
Address	113, HAMPTON ST, CLINTWOOD, CLINTWOOD PD/DICK CTY S O VA					
Exact	276-926-6850		ESN 253 - Clintwood			
Tell Tale	CLINTWOOD PD/DICK CTY S O CLINTWOOD/MCCLURE FIRE CLINTWOOD/DICK CTY AMB					
Comments	COF: COP:					



# Motorola – Emergency Callworks

Virginia State Police

Brunswick Co. 911

Halifax Co. 911/SO

Charlotte Co. 911

Lunenburg Co. 911

North Carolina Highway Patrol

☐ Connected  
☐ Recording  
☐ TDD

**Call**

**ALI Results**

Knowledge (0)

Call History (0)

Loc History (0)

**ANI Information**  
ANI: Alternate: Callback:

**ALI Information**  
Name:  
Address: Apt./Suite:  
City: State: Zip:  
County: X: Y:

**Telephony Information**  
Class: Type:  
Trunk ID: Telco ID:  
ESN: PSAP ID:  
Confidence: Uncertainty:  
Agencies:  
Update Time:





# TCS Call Handling – xT911 ALI Rebid

Customer Info

(401) 330-9990 Rebid ALI 07/07  
ESD  
ESN: 270  
RI: (401) 330-9990  
JOHN BAKER  
38 B  
ST  
PROVIDENCE RI  
LAT: 0  
LON: 0  
ELV:  
COF: 0000000  
PROVIDENCE POLICE  
PROVIDENCE FIRE  
PROVIDENCE EMS  
1 of 1  
Agent Notes

STAs

911 Re-Queue

NO CALLS

Active Agents: 1  
Hour Call Count: 0  
Previous Call Count: 0  
ACD Status: Logged In  
Available Call Servers: 1

No Alerts

Active Calls

Call State	Duration	Participants	Direction	Received	Call Back #	ALI Key	Agent	Station	Address	ESN
0 Active Calls Listed										

0 Abandoned Calls Listed

0 Queued Calls Listed

0 Total Calls Listed

Ring All Calls

Customer Name

Community

CBN

Trunk

Notes

Answer Selected Call

Call Manager

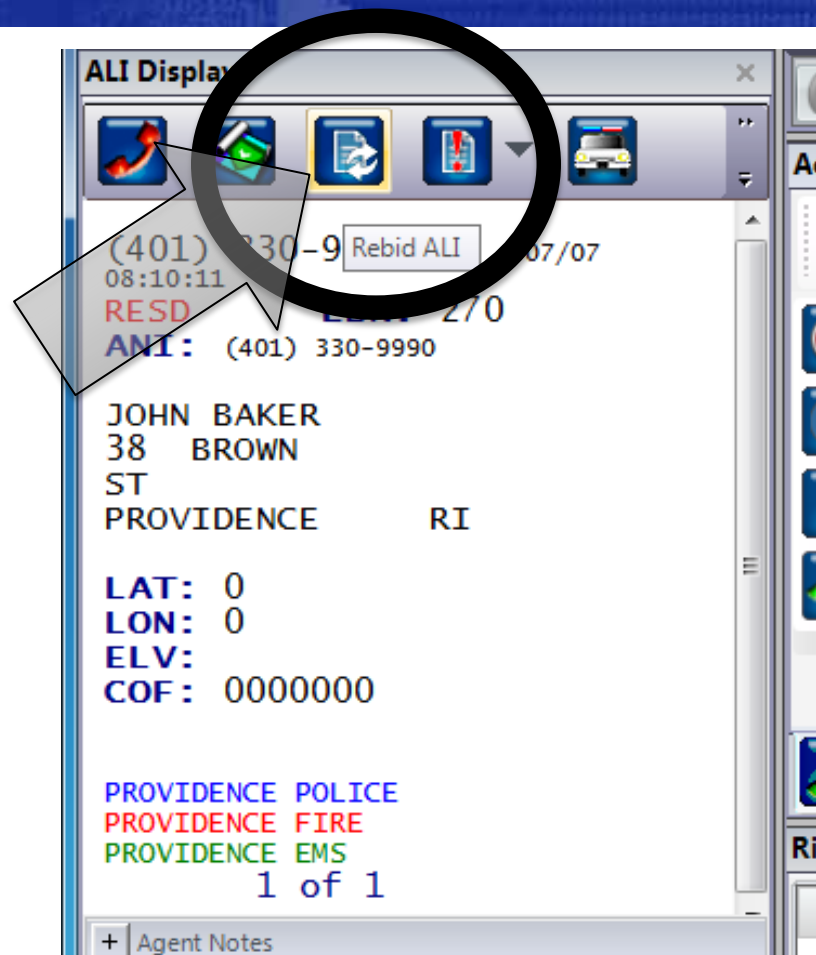
Mute

Lines

Call Participants



## TCS Call Handling – xT911 ALI Rebid Button





# TriTech (QuickLink)

QuickLink

File Edit Search Display Tools Phone View Help

Resman Search History ALI Rebid Auto Transfer Map TDD Trunks KB Recorder Answer Door Events Login

Messages Abandoned Calls

(303) 650-2222 WPH2 03/09 10:25  
Willie Williams Jr.  
1530  
Chestnut PL

LocationAny  
CO Denver  
-104.975155 39.7233823  
PID= PSAP=DENVER  
ESN=203 PILOT=650-2222  
Precinct 3  
Fire Station 5  
Denver EMS E

1 Transfers 2 Comments 3 Phone 4 ALI Correction

Auto Rebid in 2 seconds

Trunk	Status	Position	Number	Date	Len	Info
911-1						
911-2						
911-3						
911-4	CNCT	06 (please log in)	303-650-2222	03/09/06 10:25:16	04:51	WILLIE WILLIAMS JR. 1530 CHESTNUT PL DENVER 39.7233823 -104.981091
911-5						
911-6						
911-7						
911-8						
4875476						
4875477						

Sent to 911 Map via TCP/IP: [LONGITUDE]-104.975155[/LONGITUDE][LATITUDE]39.7233823 955 prior calls Pos 6 (please log in) 10.91.1.253 DB

# TriTech

## Inform 911



# ZETRON Call Handling ALI Rebid



Manual rebid is done by clicking on the circle icon shown inside of the red box.





## Automatic Re-bids

- Some jurisdictions utilize automatic rebids as a tool in reviewing their standardized location accuracy.
- It is up to the trainers and telecommunicator to know what type of Re-bid (Automatic or Manual) is occurring with their equipment and what they are seeing on the display screen.
- Each jurisdiction's individual process needs to be understood.



## Issues with Automatic Re-bids

- Typically, an automatic ALI re-bid function should only be deployed for the initial bid to retrieve the Phase II location.
- Multiple automatic re-bids unnecessarily adds to network congestion when a location update is not needed.
- An automatic re-bid can confuse the call taker in some situations. Such as; the location of the incident may be at the original location though the caller is moving (i.e., someone calling about an accident they are passing).
- Instead of the map intermittently updating itself to the caller's location, it is best to let the call taker manage the re-bid process. Though each carrier has their own re-bid interval, waiting at least 30 seconds between re-bids will work for all carriers.





## Non Service Initiated (NSI) Wireless Phones

- Cell phones that can dial 9-1-1 but have no subscriber service. Ex: when someone purchases a new cell phone and moves their service to that phone, but still have the old phone to dial 9-1-1.
- Non-Service Initiated (NSI) or disconnected handsets provide call back number with 911 area code – (Example: (911)-123-3456
- No subscriber information is available for NSI phones and little can be done for abuse callers.
- These phones are often given to charity organizations for personal safety issues. (Ex: domestic violence victims, senior citizen groups, community watch groups, etc.



## Know Your Resources

- WSP Emergency Contact Numbers
- Exigent Circumstance Procedures
  - federal law allows that if the WSP reasonably believes that an emergency involving immediate danger to life or property (an “exigent circumstance”) .. the WSP may provide subscriber information



## Additional Resources

- NENA-National Emergency Number Association
- APCO-Assoc. of Public Safety Communications Officials
- FCC- Federal Communications Commission
- SCC- State Corporation Commission
- VITA Regional Coordinators



## What would you do?

- Mapping Software / Display crashes
- 37.2885308 -80.088447
- Google [maps](#)
- [whatsmyGPS.com](#)
- [Bing Maps](#)



# Error Reporting

- Local Protocols
  - No Record Found
  - Accuracy Discrepancies
    - -O- or Very high COF



# Transferring Calls

- Local Protocol
- Understanding Capabilities
  - Does the data transfer?
  - Are you transferring to a 911 trunk or to an administrative number?
  - Is the PSAP you need to transfer to in a different LEC?
  - Is the PSAP you need to transfer to in a different LATA boundary?



## Things to Remember

- Currently all wireless phones can call 911 even if they do not have activated service.
- Wireless calls are routed by the cell sector, not by the caller's location.
- A cell tower often takes in more than one jurisdiction.
- Note whether call status is "On Line" or "Hung Up." Check conference window to see if 911 Trunk appears.



## Things to Remember

- A proper confidence factor (COF) is not delivered on all calls (it may be 0 or exceed 1,000 meters) If this is the case, a re-bid should be done.
- Do not let newer technology take the place of common sense. Always ask the caller their location. Technology such as the re-bid was intended for callers who cannot tell you their location.





## Things to Remember

- Always be aware of the factors that can affect cell reception. The following factors can contribute to decreased cell reception.
  - Buildings – Tall buildings can interfere with coverage and often people cannot get reception inside of large buildings.
  - Terrain – deep valleys and tall mountains
  - Weather – Rain and humidity can decrease the cell signal
  - Tower goes down

# Questions

